# Determination of parameters for a hyperbolic model of soils

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**Abstract:** Analysis of some geotechnical problems using finite-element methods requires the implementation of a nonlinear model for soil materials, to better represent their actual behaviour. Constitutive modelling of soil mass behaviour and material interfaces is an essential component of the solution of boundary and initial value problems. The hyperbolic model is one of the most frequently used non-linear models for predicting the behaviour of soils in boundary value problems. The parameters of this model for specific soils need to be determined experimentally. This paper presents the results of extensive laboratory testing carried out on three soils from the Eastern Province of Saudi Arabia: sand, marl and sabkha. The tests used to obtain these results were the triaxial compression test, the hydrostatic (isotropic compression) test, and the direct shear test. Additionally, other tests were used to obtain various physical properties needed for the complete characterisation of these soils. Parameters of the hyperbolic models for non-linear tangent Young's and bulk moduli are presented. These parameters compare well with those reported in the literature. They are incorporated in the hyperbolic model and used to back-predict the stress-strain behaviour of the investigated soils. The calibrated models are found to predict soil behaviour very well.